02200 - EARTHWORK

(Last revised 6/21/05)

SELECTED LINKS TO SECTIONS WITHIN THIS SPECIFICATION

PART 1 – GENERAL

The Contractor shall furnish all labor, materials, and equipment to perform all work for all site clearing, site excavation, grading and embankment, excavation and filling and backfilling for structures. Complete all as shown on the contract drawings and in accordance with these Specifications and completely coordinated with all other trades.

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Requirements and Supplementary Conditions applicable to this specification.

B. Section 01000 – GENERAL REQUIREMENTS

C. Section 02275 – TRENCHING, BACKFILLING, & COMPACTION OF UTILITIES

D. Section 02510 – WATER DISTRIBUTION

E. Section 02530 – SANITARY SEWER

F. Section 02630 – STORM DRAINAGE

G. Section 02920 – SEEDING, SODDING AND GROUNDCOVER

1.2 SUMMARY

A. This section includes:

1) Site clearing and grubbing.

2) Stripping and stockpiling topsoil.

3) Excavation and embankment placement.

4) Preparing subgrades for pavements, walks, curb & gutter, and turfed areas.

B. Construction and materials related to this section but specified in other sections:

1) Landscaping, Seeding, and Groundcover: Section 02920 – *Seeding, Sodding & Groundcover*.

2) Erosion Control: See Section 01000 - *General Requirements*.

1.3 DEFINITIONS

For the purposes of this specification, the following definitions refer to earthwork that come under the authority of the City of Fairfax, Virginia as specified within this section and other sections of this manual.

A. **Borrow**: Borrow excavation shall consist of approved select fill material imported from off-site.

B. **Clearing**: Clearing shall consist in the felling, cutting up, and satisfactory disposal of trees and other vegetation designated for removal in accordance with these specifications.

C. **Fill (in terms of volume)**: In terms of volume, fill is defined as a compacted post-construction volume in-place.

D. **Grubbing**: Grubbing shall consist of the removal of roots 1 ½ inch and larger, organic matter and debris, and stumps having a diameter of three inches or larger, to a depth of at least 18 inches below the surface and or subgrade; which ever is lower, and the disposal thereof.

E. **Regular Excavation**: Removal and disposal of any and all material above subgrade elevation, except solid rock and undercut excavation, located within the limits of construction.

F. **Rock Excavation**: Removal and satisfactory disposal of all unsuitable materials, which, in the opinion of the City Engineer, cannot be excavated except by drilling, wedging, jack hammering or hoe ramming. It shall consist of undecomposed stone, hard enough to ring under hammer. All boulders containing a volume of more than ½ cubic yard and/or solid ledges, bedded deposits, unstratified masses and conglomerations of material so firmly cemented as to possess the characteristics of solid rock which cannot be removed without systematic drilling or hoe ramming will be classified as rock.

G. **Select Fill Material**: Nonplastic material obtained from roadway cuts, borrow areas, or commercial sources used as foundation for subbase, shoulder surfacing, fill, backfill, or other specific purposes.

H. **Structures**: Incidental buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. **Subgrade**: Surface or elevation remaining after completing the excavation, or top surface of a fill or backfill immediately below subbase or topsoil materials, as applicable.

J. **Topsoil**: Topsoil shall consist of friable clay loam, free from roots, stones, and other undesirable material and shall be capable of supporting a good growth of grass.

K. **Undercut Excavation**: Undercut excavation shall consist of the removal and satisfactory disposal of all unsuitable material located below subgrade elevation. Where excavation to the finished grade section results in a subgrade or slopes of

muck, peat, matted roots, etc., the Contractor shall remove such material below the grade shown on the plans or as directed; and areas so excavated shall be backfilled with approved select borrow as ordered by the City Engineer.

1.4 SUBMITTALS

A. Submit product data and a sample of separation fabric and fully document each with specific location or stationing information, date and other pertinent information.

B. **Material Test Reports**: Provide from a qualified testing agency test results and interpretation for compliance of the following requirements indicated:

1) Classification according ASTM D2487 of each on-site or borrow soil proposed for backfill, unless otherwise directed by the City Engineer.

2) Laboratory compaction curve according to ASTM D698 for each on-site or borrow soil material proposed for fill or backfill.

3) Laboratory compaction curve according to ASTM D1557 for each on-site borrow soil material proposed for fill and backfill.

C. **Product Data**:

1) Stabilization/Separation fabric

1.5 QUALITY ASSURANCE

A. **Geotechnical Testing Agency Qualifications**: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing as documented according to ASTM D 3740 and ASTM E 548.

B. Comply with all codes, laws, ordinances, and regulations of governmental authorities having jurisdiction over this part of the work.

C. The Contractor shall comply with the latest revision of the Virginia Occupational Safety and Health Standards for the Construction Industry as adopted by the Safety and Health Codes Commission of Virginia.

D. The Contractor shall comply with Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, "Virginia Erosion and Sedimentation Control Handbook," latest revision.

E. Comply with applicable requirements of NFPA 495, *"Explosive Materials Code."*

F. Materials and operations shall comply with the latest revision of the Codes and Standards listed below:

American Society for Testing and Materials

ASTM C 33	Concrete Aggregates
ASTM C 136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates Sieve Analysis of Fine and Coarse

Aggregate

ASTM D 422 Standard Test Method for Particle-Size Analysis of Soils (for classification purposes only)

ASTM D 698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (Standard Proctor).

ASTM D 1556 Standard Method of Test for Density of Soil in Place by the Sand-Cone Method

ASTM D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3) (Modified Proctor)

ASTM D1883 Standard Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils

ASTM D 2049 Standard Method of Test for Relative Density of Cohesionless Soils

ASTM D2167 Standard Method of Test for Density of Soil in Place by the Rubber-Balloon Method

ASTM D 2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

ASTM D 2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

ASTM D 4253 Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

ASTM D 4254 Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.

ASTM D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

American Association of State Highway & Transportation Officials

AASHTO T 99 The Moisture-Density Relations of Soils using a 5.5-pound Rammer and a 12-inch drop.

AASHTO T 180 The Moisture Density Relations of Soils using a 10-pound Rammer and an 18-inch drop.

AASHTO M 145 The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.

1.6 STANDARD ABBREVIATIONS

ANSI American National Standards Institute

AREA	American Railway Engineers Association
AASHTO	American Association of State Highway & Transportation Officials
DCR	Virginia Department of Conservation and Recreation
DEQ	Virginia Department of Environmental Quality
MSDS	Material Safety Data Sheets
OHSA	Occupational Safety and Health Administration
VDH	Virginia Department of Health
VDOT	Virginia Department of Transportation
VPDES	Virginia Pollutant Discharge Elimination System

1.7 TESTING SERVICES

A. The Testing Laboratory shall be approved by the City Engineer and will be responsible for conducting and interpreting tests. The Testing Laboratory shall state in each report whether or not the test specimens conform to all requirements of the Contract Documents and specifically note any deviation.

B. Specific test and inspection requirements shall be as specified herein.

1.8 PROJECT CONDITIONS

A. **Demolition**: Demolish and completely remove from the site existing utilities, structures or surface features indicated on the plans to be removed. Coordinate with applicable utility companies to shut off services if lines are active.

B. **Environmental - Wetlands**: Before crossing or entering into any jurisdictional wetlands, Contractor shall verify whether or not a wetlands permit has been obtained for the encroachment and whether special restrictions have been imposed. Care shall be taken to prevent draining or otherwise destroying non-permitted wetlands. Restore as stated on either the project drawings, the contract documents, and/or as noted in the permit.

C. **Buffer Crossing Requirements**: Before crossing streams or ditches or working within 100 feet of any surface water, the Contractor shall verify whether the project is exempt or if a permit has been obtained to encroach into such buffers or other such regulated waters, and to what extent work is permitted to occur. Unless otherwise permitted, shown on the contract drawings, or exempted, roadways crossing stream, river, pond, or lake buffers are to be as near perpendicular as possible (the crossing is considered to be perpendicular if it intersects the stream or surface water between an angle of 75 and 105 degrees). Adhere to all of the Best Management Practices in accordance with the local and state regulations.

D. **Safety**

The Contractor shall keep the surface over and along the roadways and other excavation in a safe a satisfactory condition during the progress of the work.

E. **Geotechnical Investigation**

1) Where a Geotechnical report has been provided to the Contractor, the data on sub-surface soil conditions is not intended as a representation or warranty of the continuity of such conditions between borings or indicated sampling locations. It shall be expressly understood that the City of Fairfax will not be responsible for any interpretations or conclusions drawn there from by the Contractor. Data is made available for the convenience of the Contractor.

2) In addition to any report that may be made available to the Contractor, the Contractor is responsible for performing any other soil investigations he/they feel(s) is necessary for proper evaluation of the site for the purposes of planning and/or bidding the project, at no additional cost to the City of Fairfax.

F. **Protection of pavement**

Debris from the site shall be removed in such a manner as to prevent spillage. Keep pavement and area adjacent to site clean and free from mud, dirt, dust, and debris at all times.

1.9 COORDINATION

A. At the direction of the Director of Utilities, temporary bypass pumping of sewerage flow may be required to be provided. See Section 02530 – *Sanitary Sewer* for bypass pumping requirements and procedures.

B. Coordinate tie-ins to municipal system with the City of Fairfax.

C. When traffic signals or their appurtenances are likely to be damaged or interfered with as a result of the construction, coordinate temporary operation with the Public Works Director and VDOT, as applicable. Provide a minimum of 48 hours notice prior to anticipated disturbance or interruption.

D. **Benchmark/Monument Protection**: Protect and maintain benchmarks, monuments or other established reference points and property corners. If disturbed or destroyed, replace at own expense to full satisfaction of Owner/City of Fairfax.

E. **Valve operation/interruption of water service**: Water valves shall be operated by the Department of Utilities' staff only. Contact the Department of Utilities at 1-703-385-7920 to coordinate interruption of services and/or operation of valves. After hours, call 1-703-385-7924. Adequate notifications to water customers will be given by the Contractor prior to any interruption of service. Service is to be continuously maintained to customers in the project areas except for the minimum amount of time required to make connections with the existing system. Only in the case of an emergency may a valve be closed by a Contractor. Records shall be kept of any vales closed during an emergency and the Department of Utilities shall be notified of the specific valves closed at the earliest reasonable time following such valve closure.

If interruption is necessary, the interruption shall be arranged to occur at such a time to cause the least disruption and minimize loss of service. At the direction of the Utilities Engineer, temporary service may be required to be provided. Before shutting off any main, residents are to be notified by a City of Fairfax representative in writing at least 24 hours in advance of cut off. The Contractor shall provide assistance to the City of Fairfax in notification distribution. The City of Fairfax shall be notified at least 48 hours in advance of request for operation of valves and making either a wet tap or cut-in.

F. Before digging in the ground for any construction, call MISS UTILITY at 1-800-552-7001 to have all underground utilities marked in order to prevent damage or disruption of services. Other utilities that may have potential conflicts are:

Other Private Utilities:

Utility	Company	Phone
Electricity	Dominion Virginia Power	1-888-667-3000
Gas	Washington Gas	1-800-752-7520
Phone	Bell Atlantic/Verizon	703-954-6222
Cable TV	Cox Communication	703-378-8422

G. No blasting is permitted within the City Limits and within 50 feet of the City's transmission main in Fairfax and Loudoun Counties.

H. Permits for Construction on State Highways and Streets: The Virginia Department of Transportation requires a permit for work to be performed on State Highways. Provisions for obtaining such permits are set forth in the "Manual on Permits, Virginia Department of Transportation, Richmond, Virginia," latest revision. No work will be accepted by the Department of Utilities that has not been accepted or approved as satisfactory by the Debarment of Transportation.

I. Permits for Construction on City Streets: All permits as required by the City of Fairfax Department of Public Works shall be obtained, and their conditions adhered to, for all work to be performed on City Streets and Rights of Way.

1.10 PUBLIC CONVENIENCE

The Contractor shall at all times so conduct his work as to insure the least possible inconvenience to the general public and the residents in the vicinity of the work. Fire hydrants on or adjacent to the work shall be kept accessible to fire fighting equipment at all times. Temporary provisions shall be made by the Contractor to insure the proper functioning of all gutters, sewer inlets, drainage ditches, and irrigation ditches, which shall not be obstructed except as approved by the Public Works Director.

Fire hydrants that are either to be abandoned or are not in service shall be bagged with yellow bags. Coordination of bagging shall be coordinated with the City.

1.11 TRAFFIC CONTROL

The Contractor is responsible for Traffic Control in accordance with Section 01000 – *General Requirements*.

1.12 EROSION AND SEDIMENTATION CONTROL AND VPDES REQUIREMENTS

The Contractor shall comply with the requirements of the Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, **Virginia Erosion and Sedimentation Control Handbook**, latest edition. Construction methods shall minimize sedimentation and erosion.

It is the Contractor's responsibility to periodically monitor the Stormwater Discharge Outfall points at the specified frequency and maintain reports as required by the Virginia Department of Environmental Quality, outlined in the Virginia Pollutant Discharge Elimination System Permit Regulation (VAC 25-31, et seq.).

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

General: Provide borrow material when sufficient satisfactory soil material is not available from excavations.

2.1.1 MATERIAL CLASSIFICATION

A. **Excavation**: All excavation material shall be classified as either Unclassified Earth Excavation or Rock.

B. **Off-site Borrow** shall be select fill material approved by the City Engineer from an off-site borrow source. See section 1.3 of this specification for the definition of select fill material.

C. **Riprap and Riprap Bedding**: See the Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, **Virginia Erosion and Sedimentation Control Handbook**, latest edition.

D. **Structures, Backfill around**: Backfill shall be approved by the City Engineer and shall be free from large or frozen lumps, wood, or rocks more than 3 inches in their greatest dimension or other extraneous material. Porous backfill shall conform to the requirements of the applicable sections of the VDOT *Road and Bridge Specifications*.

E. **Topsoil**: Topsoil meeting the definition prescribed in section 1.3 obtained either from on-site or an off-site source.

2.1.2 Soil Classification

A. **Satisfactory Soils**: Non-plastic soils as defined by ASTM D 2487 soil classification group (Unified Classification System) (such as SW, SM, and SC); free of rock or gravel larger than 3 inches in any dimension, debris, organic matter, waste, frozen materials, muck, roots, vegetation, and other deleterious matter.

B. **Unsatisfactory soils**: Plastic soils as defined by ASTM D 2487 soil classification group (such as ML, CL CH, MH, OH, OL and PT); soils which contain rock or gravel larger than 3 inches in any dimension, debris, organic matter, waste frozen materials, vegetation, and other deleterious matter.

Unsatisfactory soils also include satisfactory soils not maintained within 20-percent of optimum moisture content at time of compaction, unless otherwise approved by either the Public Works Director or a Geotechnical Engineer.

2.2 MISCELLANEOUS

Geotextile fabric shall be protected from mud, dirt, dust, sunlight, and debris during transport and storage. Material shall be inert to commonly encountered chemicals; resistant to mildew, rot, insects, and rodents; and biologically and thermally stable. Geotextile fabric for subsurface installation shall not be exposed to direct sunlight for more than 24 hours before or during installation. All geo-fabric to be used within the right-of-way of a City street must be approved by the Public Works Director.

Filter Fabric for riprap, soil stabilization fabric, fabric for subsurface drains and silt fence shall comply Section 245, *Geosynthetics* of VDOT *Road and Bridge Specifications*.

PART 3 – EXECUTION

3.1 GENERAL

3.1.1 GENERAL REQUIREMENTS APPLYING TO ALL AREAS

A. Contractor shall plan construction to minimize disturbance to properties adjacent to the project site and be within the construction limits shown on the plans.

B. The City Engineer reserves the right to limit the width of land to be disturbed and to designate on the drawings or in the field certain areas or items within this width to be protected from damage.

C. **Access and/or Haul Roads**: Any grading or excavation required for equipment travel during the course of construction as well as erosion control, access or haul road installation and removal, restoration, seeding and ground cover shall be provided by the Contractor.

D. The Contractor shall be responsible for damage to areas or items designated by the City Engineer to be protected. Repairs to, replacement of, or reparations for areas or items damaged shall be made at the Contractor's expense and to the satisfaction of the City Engineer before acceptance of the completed project.

E. The Contractor shall protect all existing buildings or structures.

F. Any fences disturbed by the Contractor shall be repaired to a condition equal to or better than their original condition or to the satisfaction of the City Engineer at no additional cost.

G. Contractor shall obtain written permission from property owners for use of any access other than ones located within rights-of-way. Written permission shall contain conditions for use and restoration agreements between property owner and Contractor. No additional compensation will be made for such access.

H. All areas disturbed shall be restored to a condition equal to or better than their original condition and shall be graded to drain.

I. The Contractor shall replace or repair all damaged or destroyed hedgerows and property corners. Protection of existing and restoration of damaged or destroyed property corners shall be in accordance with the requirements of Section 01000 – *General Requirements* – Construction Staking.

3.1.2 CONSTRUCTION LIMITS

A. Contractor shall not disturb any areas outside the limits contained in this section without express written permission from the City Engineer.

B. Except as indicated on the plans, no "clear cutting" of timber shall be permitted within the construction limits. Contractor shall make select cutting of trees, taking smallest trees first, that are mandatory for the construction. The decision of the City Engineer shall be final on the determination of which trees are to be cut.

C. Should it become necessary to move the position of any underground structure, the Contractor may be required to do such work and shall be paid on a force account basis or on an extra work basis as specified directed by the City Engineer. Method of payment shall be agreed upon by the City Engineer and the Contractor prior to commencing work.

D. If existing utilities are found to interfere with the permanent facilities being constructed under this section, immediately notify the City Engineer and secure instructions. Do not proceed with permanent relocation of utilities until instructions are received from the City Engineer and the Director of Utilities.

E. **Specific requirements applying to developed subdivision/lots**

1) Unless directed otherwise by the City Engineer, all trees, shrubs, hedges, or other ornamental plantings located outside of the construction limits, easements, or public rights-of-way shall be protected by the Contractor. The City Engineer reserves the right to designate certain trees located within the construction limits for protection where deemed desirable.

2) The Contractor shall protect septic systems or springs located outside the construction limits.

3) Excavated rock shall be removed from the site unless otherwise ordered by the City Engineer.

4) Restoration and fine grading shall follow within 15 calendar days from the time an area is disturbed. Otherwise, temporary seeding and mulching will be required to be placed.

F. **Specific requirements applying to undeveloped areas**

1) In wooded areas, the clearing shall be limited to the easement or right-of-way limits unless indicated otherwise on the City of Fairfax approved construction drawings, in which case, the work shall be confined to the limits defined on the plans. All permanent easements and rights-of-way shall be fully cleared. The City Engineer reserves the right to designate certain trees located within the construction limits for protection where deemed desirable.

2) Restoration, fine grading, and permanent seeding shall follow within 15 working days or 30 calendar days, whichever is shorter, from the time an area is disturbed. Otherwise, temporary seeding and mulching will be required to be placed. See paragraph 3.13 – Seeding, Sodding, and Groundcover as well as Section 02920 – *Seeding, Sodding, and Groundcover*.

3.1.3 PROTECTION OF EXISTING UTILITIES AND STRUCTURES

A. Contractor is responsible for protection of existing utilities in accordance with Section 01000 – *General Requirements*.

B. **Subsurface Obstructions**

1) **Subsurface obstructions**: Take necessary precautions to protect existing utilities from damage due to any construction activity. The Contractor shall locate existing utilities, culverts, and structures (above or below ground), before any excavation starts and coordinate work with utility companies. The Contractor shall be responsible for notifying utility companies when working within the vicinity of the existing utilities. Omission from or inclusion of located utility items on plans does not constitute non-existent or definite location. Even though for convenience, the utility may be shown on the plans, the Contractor is responsible for and shall call for utility location a minimum of 48 hours prior to excavations. Contact underground damage protection services MISS UTILITY at 1-800-552-7001. Secure and examine local utility surveyor records for available location data including building service lines.

2) Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to excavation. In excavating, care must be taken not to remove or injure any subsurface structure. All existing gas pipes, water pipes, steam pipes, telephone lines, cable TV lines, electrical conduits, sewers, drains, fire hydrants, and other structures which, in the opinion of the utility company, do not require relocation shall be carefully supported, shored up, the flow maintained, if applicable, and the line/main protected from damage by the Contractor. If damaged, the Contractor shall give immediate notice to the proper authorities. The utility shall be restored, at the Contractor's expense, by the appropriate utility to original or better condition. Where pipes, conduits, or sewers are removed leaving dead ends in the ground, such ends shall be carefully plugged or bulkheaded by the Contractor at the Contractor's expense. The Contractor shall be responsible for any damage to persons or property caused by such breaks.

3) The Contractor shall be responsible for anticipating and locating underground utilities and obstructions. When construction appears to be in close proximity to existing utilities, test pits shall be made a sufficient distance ahead of the work to verify the exact locations and inverts of the utility to allow for changes in grade or utility relocation.

4) If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.

5) Should it become necessary to move the position of any underground structure, the Contractor may be required to do such work and shall be paid on a force account basis or on an extra work basis as specified in Section 01000 – *General Requirements*. Method of payment shall be agreed upon by the City Engineer and the Contractor prior to commencing work.

6) If existing utilities are found to interfere with the permanent facilities being constructed under this section, immediately notify the City Engineer and secure instructions. Do not proceed with permanent relocation of utilities until instructions are received from the City Engineer and the Director of Utilities.

C. **Protection of Surface Features**

1) Whenever construction is to take place on or near a paved street, the Contractor shall provide pads or take necessary precautions to protect the pavement from damage by the construction equipment. Pavement damaged by cleated or tracked equipment, or by any other means, shall be repaired by the Contractor at his expense to the satisfaction of the City Engineer.

2) Where joining existing pavements, the Contractor shall use care to cut the existing pavement in sharp, neat lines. If the existing road to be cut is located within another jurisdiction other than the City of Fairfax or within VDOT rights of way, the Contractor is responsible for contacting the local representative or VDOT, respectively about pavement repair/replacement.

3) Avoid overloading or surcharge a sufficient distance back from edge of excavation or fill to prevent sloughing, slides, or caving. Maintain and trim excavated materials in such manner to be as little inconvenience as possible to public and adjoining property.

4) Provide full access to public and private premises, to fire hydrants, at street crossings, sidewalks and other points as designated by the City Engineer to prevent serious interruption of travel.

5) Protect and maintain benchmarks, monuments, or other established points and reference points and if disturbed or destroyed, replace items to full satisfaction of the City Engineer and the jurisdictional agency.

D. **Procedures for repairing damaged utility services**

1) If a located service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the City.

2) **House services**: If a service pipe supplying water or sewer service to an adjoining house is broken, the Contractor shall repair same at once and at his expense. The City may, at the Contractor's expense, repair any such service without prior notice to the Contractor.

3.1.4 PROTECTION OF PERSONS AND PROPERTY

A. Barricade open holes and depressions occurring as part of the work, and post warning lights on property adjacent to or part of public access.

B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this or other related sections.

C. **Protection and Restoration of Property:** The Contactor shall not enter upon private property for any purpose without first obtaining permission. He shall use every precaution necessary to prevent damage or injury to any public or private property, trees, fences, monuments, and underground structures, etc., on and adjacent to the site of the work. He shall protect carefully from disturbance or damage all land monuments and property markers until an authorized agent has witnessed or otherwise referenced their locations, and shall not remove them until directed.

The Contractor shall be responsible for all damage or injury to property of any character resulting from any act, omission, neglect, or misconduct in his manner or method or executing said work, from his nonexecution of work, or from defective work or materials, and he shall not be released from said responsibility until the work shall have been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, he shall restore such property, at his own expense, to a condition equal to or better than that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring, and may be directed or he may make good such damage or injury in an acceptable manner.

The Contractor shall, at his own expense, sustain in their places and protect from direct or indirect injury all pipes, poles, conduits, walls, roadways, buildings, and other structures, utilities and property in the vicinity of his work. Such sustaining and supporting shall be carefully done by the Contractor and as required by the Company or party owning the structures or Agency controlling it. The Contractor shall take all risks attending the presence or proximity of pipes, poles, conduits, walls, thereof and any costs associated will be deducted from any monies due the Contractor. Failure of the City Engineer or his/her authorized representative to direct the correction of unsafe conditions or practices shall not relieve the Contractor of his responsibility hereunder.

3.2 CLEARING AND GRUBBING

A. This work shall consist of clearing, grubbing, removing, and disposing of all vegetation and debris within the limits of construction, as designated on the plans or as required by the City Engineer. The Contractor shall remove only those trees and shrubs absolutely necessary to allow for the construction. The work shall also include the preservation from injury of defacement of all vegetation or object designated to remain.

B. A preconstruction meeting shall be held with appropriate forestry personnel, if required, and the City prior to any clearing. The City Engineer may require tree protection fencing in sensitive areas, where specifically identified trees are desired to be protected, and when required by the landscape ordinance.

C. The area within the limits of construction or as designated shall be cleared and grubbed of all trees, stumps, roots, brush, undergrowth, hedges, heavy growth of grasses or weeds, debris and rubbish of any nature which, in the opinion of the City Engineer, is unsuitable for foundation material. Nonperishable items that will be a minimum of 5 feet below the finish elevation of the earthwork or slope of the embankment may be left in place.

D. The Contractor shall provide barricades, fences, coverings, or other types of protection necessary to prevent damage to existing improvements, not indicated to be removed, and improvements on adjoining property. All improvements damaged by this work shall be restored to their original condition or to a condition acceptable to the owner or other parties or authorities having jurisdiction.

E. **Protection of Trees and Vegetation**: Contractor shall protect existing trees and other vegetation indicated by the City Engineer to remain in place against cutting, breaking, or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary fences or barricades as required to protect trees and vegetation to be left standing at no additional cost.

   Trees and shrubs that are to remain within the construction limits will be indicated on the drawings or conspicuously marked on site. Unless otherwise noted, trees within the construction limits shall become the property of the Contractor and shall be removed from the site.

   Carefully and cleanly cut roots and branches of trees indicated to remain where the roots and branches obstruct construction of the utility line. The Contractor shall provide protection for roots and branches over 1 ½ inches diameter that are cut during construction operations. Temporarily cover all exposed roots with wet burlap to prevent roots from drying out. Provide earth cover as soon as possible.

   Damaged trees and vegetation designated to remain shall be repaired or replaced at Contractor's expense in a manner acceptable to the City Engineer if they are damaged by construction operations. Repair tree damage as directed by a qualified tree surgeon.

F. Trees and vegetation designated to remain shall be repaired or replaced at Contractor's expense in a manner acceptable to the City Engineer if they are damaged by construction operations. Repair tree damage as directed by a qualified tree surgeon.

G. All brush, tree tops, stumps, and debris shall be hauled away and disposed of in accordance with all applicable laws and regulations. The Contactor shall clean up debris resulting from clearing operations continuously with the progress of the work and remove promptly all salvageable material that becomes his property and is not to be reused in construction. Sale of material on the site is prohibited. Debris from the site shall be removed in such a manner as to prevent spillage. Keep pavement and area adjacent to site clean and free from mud, dirt, dust, and debris at all times.

H. The method of stripping, clearing and grubbing the site shall be at the discretion of the Contractor. However, all stumps, roots and other debris protruding

through the ground surface or in excavated areas shall be completely removed to a minimum depth of 18 inches below surface and/or subgrade whichever is lower and disposed of off the site by the Contractor, at his expense.

I. **Marginal Areas**: In marginal areas, with the City Engineer's permission, remove trees where the following conditions exist.

1) **Root Cutting**: When clearing up to the "clearing limits," the Contractor shall also remove any tree which is deemed marginal such that when the roots are cut and the tree could be rendered unstable by the affects of high winds and in danger of toppling into either the right-of-way or onto private property.

2) **Slender Bending Trees**: Where young, tall, thin trees are left unsupported by the clearing operation, and are likely to bend over into the right-of-way, the Contractor, during the clearing operation, shall selectively remove those trees which are located outside and adjacent to the clearing limits and City right-of-way or easement as well. During the course of construction and during the one-year warranty period, the Contractor shall remove such young trees that overhang into the right-of-way or cleared area.

J. **Stripping of Topsoil**: Remove the existing topsoil to a depth of 6 inches or to the depth encountered from all areas in which excavation will occur. The topsoil shall be stored in stockpiles, separate from the excavated material, if the topsoil is to be respread. Otherwise material shall be disposed of off-site at the Contractor's expense.

K. **Disposal**: All brush, treetops, stumps, and debris shall be hauled away and disposed of in accordance with all applicable laws and regulations. The Contactor shall clean up debris resulting from clearing operations continuously with the progress of the work and remove promptly all salvageable material that becomes his property and is not to be reused in construction. Sale of material on the site is prohibited.

Disposal of cleared material shall be in accordance with all local and state laws. Trees cut down on the construction site will be hauled away from the site for proper disposal unless instructed otherwise by the City. Stumps of trees cut down outside of the excavation area will be removed. Perishable material shall not be disposed of at the construction site. Brush, laps, roots, and stumps from trees shall be disposed of in a DEQ approved and permitted land clearing and inert debris type landfill. The Contractor will be responsible for obtaining all applicable permits and paying all fees for the disposal of excess material.

3.3 UNCLASSIFIED EXCAVATION, UNDERCUTTING, BORROW, EMBANKMENT:

3.3.1 DESCRIPTION

Prior to beginning grading or embankment operations in any area, all necessary clearing and grubbing in that area shall have been performed in accordance with these specifications.

Should the Contractor, through negligence or other fault, excavate below the designated grades, he shall replace the excavation with approved satisfactory materials, in an approved method, at his own expense. All material determined

unsatisfactory shall be disposed of in waste areas as directed. Topsoil shall not be used in embankments but shall be handled and placed as directed.

The Contractor shall satisfy himself as to the character, quantity, and distribution of all materials to be excavated. No payment will be made for any excavated material that is used for purposes other than those designated.

3.3.2 CONSTRUCTION METHODS

A. **Excavation**: Excavation shall be performed as indicated on the plans or as directed by the City Engineer to the lines, grades, and elevations, and shall be finished to a reasonable smooth and uniform surface. During the process of excavation, the grade shall be maintained and surface shall be rolled so that it will be well drained at all times.

When solid rock is incurred in the excavation, the rock shall be removed to a minimum depth of 12 inches below the surface of the subgrade. Material unsatisfactory for subgrade foundation shall be removed to a depth specified to provide a satisfactory foundation. The portion so excavated shall be refilled with suitable material obtained from the grading operations or borrow area and thoroughly compacted by rolling. Material obtained from on site grading operation must be approved by the City Engineer. For areas that do not require fill, scarify and compact to a depth of 6 inches.

Any removal, manipulation, aeration, replacement, and recompaction of suitable materials necessary to obtain the required density shall be considered as incidental to the construction operations, and shall be performed by the Contractor at no additional cost to the City.

No rock, stone, or rock fragments, larger than 3 inches in their greatest dimension will be permitted in the top 12 inches of the subgrade. No rock, stone, or rock fragments larger than 8 inches in their greatest dimension will be permitted in the remainder of the fill.

B. **Stabilization of soft subgrade with Geotextile**: The use of Geotextile material for subgrade stabilization shall be approved by the City Engineer and shall meet all applicable VDOT standards and specifications.

C. **Borrow**: Borrow shall not be used until all suitable, on-site, excavated material has been placed in the embankment, unless authorized by the City Engineer. Unless otherwise designated on the plans and contract documents, the Contractor shall make his own arrangements for obtaining select fill material for borrow and pay all costs involved. If the Contractor places more borrow than is required, and thereby causes a waste of excavation, the amount of such waste, unless authorized, will not be included for payment.

D. **Embankments**:

1) **Evaluation of Subgrade**: Prior to placement of compacted fill, the City Engineer or his representative shall carefully inspect the exposed subgrade. The Contractor shall then proofroll the exposed subgrade, in the presence of the City Engineer or his representative. The inspection shall include, but not be limited to, proofrolling the prepared subgrade with a rubber-tired fully loaded dump truck that has a minimum gross weight of at least 20,000

pounds (10 tons). No other method will be acceptable. Any unsatisfactory materials thus exposed shall be removed and replaced with satisfactory select material as approved by the City Engineer. Provide the necessary amount of select fill compacted to the density requirements outlined in this specification.

2) **Preparation of Ground Surface for Embankments or Fills**. Before fill is placed, scarify existing grade to a minimum depth of 6 inches. In areas where the existing or proposed ground surface is steeper than one vertical to four horizontal, plow surface in a manner to bench and break up surface so that fill material will bind with the existing surface.

3) Embankments shall be made of satisfactory soil material and shall be built in successive horizontal layers of not more than 8 inches in loose depth for the full width of the cross sections.

   The material entering the embankment in each of the layers shall be within a tolerance of plus or minus 20% of the optimum moisture content before rolling to obtain the prescribed density. Wetting or drying of the material and manipulation when necessary to secure uniform moisture content throughout the layer shall be required. Should the material be too wet to permit proper compaction or rolling, all work on the embankment shall be delayed until such time as the material has dried to the required moisture content. If high moisture is due to negligence of contractor due to improper drainage, the City Engineer may require removal and replacement of material.

   Fill material shall not be placed on frozen ground or areas covered with ice and/or snow or areas with moisture content above optimum.

E. **Undercut Excavation**:

   Undercut Excavation: Undercut excavation shall consist of the removal and satisfactory disposal of all unsuitable material located below subgrade elevation. Where excavation to the finished grade section results in a subgrade or slopes of muck, peat, matted roots, etc., the Contractor shall remove such material below the grade shown on the plans or as directed; and areas so excavated shall be backfilled with approved select borrow as ordered by the City Engineer.

   For definition of undercut excavation, see paragraph 1.3 K – Undercut Excavation.

F. **Preparation of areas to receive asphalt pavement or concrete**:

1) **Areas to be paved**: After all excavation, undercutting, and backfilling has been completed, the subgrade shall be properly shaped and thoroughly compacted. The compactive effort shall include all areas beneath pavement and shall extend at least a minimum of 1 foot behind the paving limits. Compaction shall be in accordance with Table 2200-2.

2) The Contractor shall then proof roll the exposed subgrade, in the presence of the City Engineer or his representative. The inspection shall include, but not be limited to, proofrolling the prepared subgrade with a rubber-tired fully loaded dump truck that has a minimum gross weight of at least 20,000

pounds (10 tons). No other method will be acceptable. Any unsatisfactory materials thus exposed shall be removed and replaced with satisfactory select material as approved by the City Engineer. Provide the necessary amount of select fill compacted to the density requirements outlined in this specification.

3) **Curb and gutter, sidewalks and driveway aprons**: The subgrade shall be constructed true to grade and cross section as may be shown on the drawings. Compaction shall be in accordance with Table 2200-2.

All subgrade shall be graded and protected as to prevent an accumulation or standing water, and consequent subgrade saturation, in the event of rain.

G. **Grading tolerances of finished surface**: Earthwork shall conform to the lines, grades, and typical cross sections shown on the plans or as established by the City Engineer. Changes in grade shall be accomplished by smooth curves.

1) Shape subgrade under pavement and curb and gutter to within ½ inch of required subgrade elevations.

2) Finish pavement and curb and gutter to within ½ inch of required finish elevations.

3) Shape subgrade under sidewalks to within 0.10 foot of required subgrade elevations.

4) Finish sidewalks to within 0.10 foot of required finish elevations.

5) For all other areas, subgrade and finish elevations shall be within 0.10 foot of required corresponding elevations.

H. **Backfill of Curb and Gutter and sidewalks**: Immediately after the removal of forms for curb and gutter, sidewalks and driveways, the space between the back of the curb, sidewalks, and driveways shall be backfilled and smoothed off in a manner to prevent the accumulation of standing water.

3.4 ROCK

3.4.1 Rock Excavation – Definition: See paragraph 1.3 F for definition of rock excavation.

3.4.2 Disposal of Rock: Excavated rock shall be hauled off the site at the Contractor's expense. Borrow required to replace excavated rock shall be provided by the Contractor and shall be included in the unit price bid for rock excavation. No rocks or boulders shall be used as backfill in any part of the site unless otherwise approved by the City Engineer.

3.5 SUBGRADE COMPACTION TESTING AND CONTROL

A. **Municipal Projects**: For municipal projects, the City may employ and compensate a Geotechnical testing firm to provide soils testing and inspection services.

B. **Private Projects**: For private development projects which involves proposed City-owned infrastructure the developer, at the discretion of the City Engineer, may be required to employ a Geotechnical testing firm to perform the testing and provide copies of the tests reports to the City for approval and record.

C. **Testing**

Testing of embankment/borrow shall be performed by an independent laboratory approved by the City and the Contractor. The Contractor shall be responsible for excavation for testing.

Quality Assurance vs. Quality Control:

Quality Assurance (QA) testing, and the associated cost, is the responsibility of the City. Quality Assurance testing by the City is used to confirm that the Contractor is generally performing his/her work in compliance with these specifications.

Quality Control (QC) testing is the necessary and required testing that is to be performed by the Contractor to assure that he/she is meeting and complying with the requirements of these specifications. The associated cost for QC testing is the contractor's responsibility. The Contractor is also responsible for "re-testing" costs incurred by the City when the City test results (tests for Quality Assurance) results in a "failure."

D. **Quality Assurance (QA):**

In the course of placement of embankment fill/borrow, the City Engineer may require "Field Density Determinations" or compaction tests. When compaction tests are called for, the City Engineer will determine the location of the tests and the City shall engage a qualified testing firm to perform the test. Field density determinations shall be performed in accordance with AASHTO T191, T205, and T214, modified to include material sizes used in the laboratory determination of density with nuclear field density testing device or by other approved methods. A representative of the City will observe tests and a copy of the test results and inspection report will be submitted by the testing firm directly to the City Engineer. When the average of 3 test results, with no one test failing by more than 3 percentage points, indicate that the density is less than the percent specified, the Contractor shall excavate and re-compact the areas that have failed at no expense to the City. Payment for failed compaction test shall be made by the Contractor by deducting the cost from the forthcoming retainage or billed directly to the Contractor.

E. **Quality Control (QC):**

For City funded projects, the City shall pay for the cost of both Quality Control and Quality Assurance testing. However, where backfill compaction is suspect and questionable, the material shall be removed as directed by the City Engineer and the area tested. If a suspect area fails to meet the prescribed minimum moisture density test requirements, the soil shall be removed, replaced, compacted, and re-tested, as directed by the City Engineer, until the backfill meets or exceeds the minimum density requirements. The Contractor shall pay for all costs associated with re-testing.

F. **All Projects**:

1) **Minimum Compaction Testing Frequency**:

Table 2200.1	
Testing Frequency	
Location	**Frequency**
Buildings and structures	1 test group[a] for every 5,000 square feet
Road	1 test group for every 100 feet PEE 6" Lift
Parking Lots	1 test group for every 10,000 square feet
Unpaved areas	1 test group for every 20,000 square feet
Pipe Trench	1 test group for every 100 feet PEE 6" Lift
Proof Roll	Entire surface area to be paved
Exception: Where additional tests are required to determine the extent of unacceptable compaction (having been determined by the initial QA/QC test). In this case, the costs for these additional tests are the responsibility of the Contractor.	

[a] One test group consists of compaction tests on each layer of fill and backfill material.

2) In the absence of a pre-construction Geotechnical investigation, the Geotechnical testing firm is to perform laboratory Proctor tests to establish a moisture-density relationship for all materials that are proposed to be used as fill.

3) Contractor shall give a 24-hour notice to Geotechnical testing firm when ready for Proctor, compaction, or subgrade testing and inspection.

4) Should any moisture-density test fail to meet specification requirements, the Contractor shall perform corrective work necessary to bring the material in compliance and retest the failed area at no additional cost to the City.

G. **Site access for testing:** Ensure City, at all times, has immediate access to the site for testing of all soils related work. Ensure excavations are in a safe condition for testing personnel.

3.6 SUBGRADE PREPARATION AND COMPACTION REQUIREMENTS

A. **Minimum Compaction Requirements**: Compaction percentages are percentages of maximum dry density as determined by indicated ASTM Standards. Unless noted otherwise on drawings or more stringently by other sections of these specifications, place and ensure degree of compaction of embankment and borrow materials does not fall below the following percentages of the maximum density at optimum moisture content. Tolerance is to be within +/- 3 percentage points of the optimum moisture content unless otherwise specified by the City Engineer or Geotechnical Engineer.

Table 2200-2	
Minimum Compaction Limits	
Location	**Density**
Site and Public Roadways	

Embankment/borrow under roadway pavement surfaces, sidewalks, and curb and gutter	Top 12 inches	100% of the maximum dry density by ASTM D698 (Standard Proctor), AASHTO T99.
	Up to within 12 inches	95% of the maximum dry density by ASTM D698 (Standard Proctor), AASHTO T99.
Roadway Shoulders	95% of the maximum dry density by ASTM D698 (Standard Proctor), AASHTO T99.	
Under turf, sodded, planted, or seeded non-traffic areas	**Cohesive Soils**: 90% of the maximum dry density by ASTM D698 (Standard Proctor), AASHTO T99.	
	Cohesionless Soils: 60% of ASTM D4253.	
Building Structures		
Embankment/borrow beneath and within 5 feet of buildings, under foundations, and scarified existing subgrade beneath buildings.	Top 12 inches	100% of the maximum dry density by ASTM D698 (Standard Proctor)
	Up to within 12 inches	95% of the maximum dry density by ASTM D698 (Standard Proctor)
Outside structures next to walls and any other structural exterior member	90% of the maximum dry density by ASTM D698 (Standard Proctor)	
Backfill less than 10 feet from exterior retaining walls	90% of the maximum dry density by ASTM D698 (Standard Proctor)	

B. **Failure of compactive efforts**: If compaction efforts should fail to provide a stable subgrade, after subgrade materials have been shaped and brought to optimum moisture, such unstable materials shall be removed to the extent directed by either the Geotechnical Engineer or the City Engineer and replaced and compacted using new select material and must pass compaction test prior to proceeding to the next stage of construction.

C. **Compaction Lifts**:

Table 2200-3	
Compaction Lift Thickness of	
Lift Thickness (inches)	**Location**
6	Inside street rights-of-way
12	Outside street rights-of-way

D. In-place testing of soils shall be tested based on the following:

Table 2200-4
In-Place Density Tests

Soil Type/Classification	Reference Standard
Crushed Rock	ASTM D 2049 by percentage of relative density ASTM D 1557 or D 698 (standard Proctor)
GW, GP, SW and SP	ASTM D 2049 by percentage of relative density ASTM D 1557 or D 698 (standard Proctor)
GM, GC, SM, SC, ML, CL	ASTM D 2167, D1556, D2922, or D2937 by percentage of Standard Proctor Density according to ASTM D 698 or AASHTO T99

3.7 STRUCTURES: EXCAVATION, FILLING, AND BACKFILLING

A. **General**

See Section 02275 - *Trenching, Backfilling, and Compaction of Utilities* for excavation and backfilling for structures (manholes, etc.). See VDOT Road and Bridge Specifications, latest revision for excavation and backfilling for retaining walls.

B. **Protective Measures for Structures**

1) Drainage: Control grading around structures so that ground is pitched to prevent water from running into excavated areas or damaging structures. Maintain excavations where foundations, floor slabs, equipment support pads or fill material are to be placed free of water. Provide pumping required keeping excavated spaces clear of water during construction. Should any water be encountered in the excavation, notify City Engineer. Provide free discharge of water by trenches, wells, or other means as necessary and drain to point of disposal.

2) **Frost Protection**: Do not place foundations, footings, or fill material on frozen ground. When freezing temperatures may be expected, do not excavate to full depth indicated, unless foundations, footings or fill material can be placed immediately after excavation has been completed and approved. Protect excavation from frost if placing of concrete or fill is delayed.

3) **Protection of Structure:** Prevent new and existing structures from becoming damaged due to construction operations or other reasons. For catch basins, provide temporary weep holes with a non-woven filter fabric to relieve hydrostatic pressure on walls.

3.8 RIP RAP AND RIP RAP BEDDING PLACEMENT

Placement of Rip Rap and Rip Rap Bedding shall conform to VDOT *Road and Bridge Specifications*, latest revision.

3.9 PLACEMENT OF SOIL STABILIZATION FABRIC

Placement of soil stabilization fabric shall conform to VDOT *Road and Bridge Specifications*, latest revision and in accordance with the recommendations and directions of the City Engineer and/or Geotechnical Engineer for the application and use intended.

3.10 SUBSURFACE DRAINAGE SYSTEMS

See Section 02630 – *Storm Drainage* and Section 02275 – *Trenching, Backfilling, and Compaction of Utilities* for both materials and construction requirements regarding subsurface drainage systems.

3.11 METHOD OF VOLUME MEASUREMENT

Contractors are required to furnish accurate counts of all excavation and/or fill moved which is to be paid for under a Contract unit price. The volumes shall be measured by either "truck tally" or by "cross-sectioning," whichever method is approved by the City Engineer or stated in the proposal and/or bid documents. When a truck count is used, the City Engineer or their representative shall verify the count independently.

A. **Truck Tally Method:**

Excavation: When unclassified excavation or undercut volumes are to be counted by the truck tally method, "swell" is to be incorporated into the truck volume in the amount of 15%. Unless otherwise agreed to or justified by a Geotechnical Engineer, the following pay volumes are to be used for either unclassified or undercut excavation:

Tandem:	13 CY
Tri-axle:	15 CY

Borrow: When either off-site or on-site borrow is to be counted by the truck tally method, "shrinkage" is to be incorporated into the truck volume in the amount of 15% (shrinkage of truck volume placed compared to compacted fill volume) utilizing the following pay volumes:

Tandem:	10 CY
Tri-axle:	12 CY

Loading Truck: A qualified truck load is one that is loaded up to within approximately 6" of the top of the dump bed, prior to dumping.

B. **Average-End-Method:**

Excavation and fill can be computed using the average-end-method. When used, this method is to be employed using the existing contours shown on the Contract Drawings and the Contractors actual surveyed finished contours (surveyed by a licensed Professional Surveyor). In so doing, the finished contours are to be plotted at the same scale as the original drawing and a transparency furnished to the Engineer for comparison to design grades. The volume computations are also to be submitted along with the Surveyors seal and a certification as to the volumes measured.

The Contractor, at his discretion and with the prior approval of the Engineer, may survey the "stripped" site (the site after topsoil has been removed) and compute the volumes based on the stripped site and the "designed" finished grade as shown on the Contract Drawings. As before, a transparency to the same scale and the Surveyors computations and certification are to be submitted to the Engineer for comparison and verification.

C. **Volume Formulas:**

Unless otherwise approved, the following formulas are to be used in computing cut and fill:

Fill Formula

Net Fill = Raw Fill Vol. – Unclassified Excavation X (1 - Shrink Factor) + Strip Vol. - Undercut or waste Fill placed in Fill Slopes X (1 - Shrink Factor) - Pavement Section or Building Floor Pad

Cut Formula

Net Cut = Raw Cut - Strip Vol. + Pavement Section or Building Floor Pad

3.12 CLEANUP AND RESTORATION OF SITE

A. The Contractor shall clean and maintain the site as specified in Section 01000 – *General Requirements*.

B. During the progress of the work, the Contractor shall keep the premises and the vicinity of the work clear from unsightly and disorderly piles of debris. Suitable locations shall be specified for the various construction materials and for debris. The materials shall be kept in their storage locations, except as needed for the work and debris shall be promptly and regularly collected and deposited in the specified location.

C. Upon completion of grading operations, the Contractor shall fine grade the site, removing all surplus excavated material, leaving the area free from surface irregularities. He shall dispose of all surplus material, dirt, and rubbish from the site and shall keep the site free of mud and dust to the satisfaction of the City Engineer. The Contractor may be required to flush or sprinkle the street to prevent dust nuisance.

D. When working on the shoulders of paved roads, the Contractor shall keep the pavement clean of all loose earth, dust, mud, gravel, etc., and shall restore roadway shoulders and ditches as required by either the VDOT or the right-of-way owner.

E. After all work is completed, the Contractor shall remove all tools and other equipment, leaving the site free, clean, and in good condition.

F. The Contractor shall keep the surface over and along the roadways and other graded areas in a safe and satisfactory condition during the progress of the work and for a period of one year after the work has been competed. He shall be held responsible for any accidents that may occur on the account of the defective condition of such surface.

3.13 SEEDING, SODDING, AND GROUNDCOVER

3.13.1 GENERAL

A. Seeding, Sodding, and Groundcover shall comply with the applicable provisions and requirements of Section 02920 – *Seeding, Sodding & Groundcover* and Section 01000 – *General Requirements*.

B. Seeding and groundcover includes seedbed preparation, liming, fertilizing, seeding, and mulching of all disturbed areas. Areas inside or outside the limits of construction that are disturbed by the Contractor's operation and activity shall be seeded and mulched.

Unless called for otherwise on the Erosion and Sedimentation Control Plan, in areas where natural sod or vegetation has been disturbed, the area shall be seeded in accordance with Section 02920 – *Seeding, Sodding & Groundcover*.

If the construction activity disturbed a landscaped lawn, the seeding shall be modified to restore ground cover comparable to the existing lawn.

C. Seeding shall be carried out as soon as practical after the construction in any one area, and shall be maintained against erosion through the completion of the project. Seeding shall be accomplished as work progresses.

The Contractor shall be responsible for proper care of the seeded area during the period that vegetation is being established. In the event of an erosive rain before an adequate stand of vegetation has been established, damaged areas shall be repaired, fertilized, seeded, and mulched at the Contractor's expense.

Seeding on rights of way of VDOT maintained roads shall be in accordance with VDOT specifications and the requirements of the approved encroachment permit.

D. **Temporary Seeding**: Denuded areas to be graded during the construction phases that are not to be brought to final grade within 30 days shall receive temporary seeding and mulching within 15 days of completing initial earthwork. Note that the time for establishment of permanent ground cover is 15 working days or 30 calendar days whichever is shorter. Temporary seeding shall also be used to stabilize finished grade areas if the time of year is outside the specified permanent seeding periods.

E. **Stockpile Area**: The Contractor is responsible for securing an equipment storage, material lay down, and stockpile storage area for his work in accordance with Section 01000 – *General Requirements*. As such, the Contractor is responsible for the necessary erosion control measures, including but not necessarily limited to, a construction entrance, silt fence, protection of streams/buffers, clean up and restoration of site to the satisfaction of both the City and the DCR, Division of Soil and Water Conservation. Stockpile and/or waste areas must be maintained within the limits of the areas protected by the proposed measures and otherwise temporarily seeded if to be left stockpiled over 30 days.

3.14 MISCELLANEOUS

3.14.1 DUST CONTROL

The Contractor shall be required to sprinkle with water or to apply dust allaying materials in the vicinity of dwellings, schools, churches, stores, or other places, where in the opinion of the City Engineer, it is necessary to ensure that dust is

held to an absolute minimum. Dust control is considered incidental and shall be carried out at the Contractor's expense.

3.14.2 SALVAGE OF USEABLE MATERIALS

All materials such as iron castings, paving blocks, brick, pipe and etc., removed during excavation that is useable on this project shall be used after approval of its use by the City Engineer or the applicable owner of the street right-of-way. Such material shall be stockpiled on site. Unnecessary abuse and damage to these items shall be the Contractors responsibility and the cost of replacement may be deducted from the retainage.

End of Section 02200

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